

## REMARKS

Applicant appreciates the detailed examination evidenced by the Office Action mailed October 20, 2006 (hereinafter "Office Action"). In response thereto, Applicant respectfully provides the above amendment to the claims in which Claims 1, 3, 4, 6 and 7 are amended and Claims 8 and 9 are canceled. Claims 1-7, 10, and 11 are presently pending in the application. Applicant respectfully submits that all claims are in condition for allowance for at least the reasons stated below.

### **Claims 6 and 7 are definite under 35 U.S.C. §112, second paragraph**

The Office Action rejects Claims 6 and 7 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Office Action, page 2. Regarding Claim 6, the Office Action states that the limitation "the conductive plug" lacks sufficient antecedent basis. Office Action, page 2. Applicant respectfully submits that Claim 6 is amended to change the language "the conductive plug" to "the conductive contact," which has antecedent basis in Claim 1. Regarding Claim 7, the Office Action states that the language "wherein the first spacer does not contact the spaced isolated from the contact pad" is vague and indefinite. Applicant agrees and has amended Claim 7 accordingly.

### **Claim 1 is patentable over Yokoyama**

The Office Action states that Claim 1 is rejected under 35 U.S.C. §102 as being anticipated by U.S. Patent No. 6,703,715 to Yokoyama ("Yokoyama"). Office Action, page 3. Applicant respectfully submits that Claim 1 is amended to more clearly express the recitations therein. Since the recitations of Claim 1 are not significantly different in the context of the rejections, Applicant will address the substantive aspects of the rejections. Applicant respectfully traverses the rejection on the basis that Yokoyama does not disclose or suggest all of the recitations of Claim 1. For example, Claim 1 recites:

An integrated circuit device comprising:

a conductive contact in a hole in an interlevel dielectric layer;

a first spacer having a first dielectric constant on a side wall of the conductive contact; and

***a second spacer having a second dielectric constant*** located between the first spacer and the side wall of the conductive contact,

wherein the first dielectric constant is less than the second dielectric constant.

(*Emphasis added.*) In rejecting Claim 1, the Office Action states that Yokoyama discloses:

a conductive contact (32) in a hole in an interlevel dielectric layer, a first spacer (40/26) having a first dielectric constant on a side wall of the conductive contact; and  
a second spacer (38/28) having a second dielectric constant that is less than the first dielectric constant located between the first spacer and the side wall of the conductive contact (column 7, lines 6-9).

Office Action, page 3. Applicant respectfully submits that the rejection, as stated above, merely recites Applicant's claim language and does not properly construe Yokoyama.

In contrast with Claim 1, Yokoyama discusses a plug 32, a lower spacer insulation film 26, and a barrier insulation film 28 such that the barrier insulation film 28 is between the plug 32 and the lower spacer insulation film 26.

Yokoyama, column 9, lines 42-53 and FIG. 5. Yokoyama specifically uses the term "spacer" describing the "lower spacer insulation film 26." In contrast with the Office Action allegation, Yokoyama does not use the term "spacer" in describing the structure identified as "barrier insulation film 28." Given that Yokoyama specifically uses the "spacer" language when applicable, a proper construction of Yokoyama does not support the importation of the "spacer" terminology and/or function to structures not identified as such (e.g., barrier insulation film 28.) Thus, Yokoyama does not disclose or suggest "***a second spacer having a second dielectric constant,***" as recited in Claim 1. Accordingly, Claim 1 is patentable over Yokoyama for at least these reasons.

### **Claim 1 is patentable over Park**

The Office Action states that Claim 1 is rejected under 35 U.S.C. §102 as being anticipated by Park et al. ("Park"). Office Action, page 6. Although the Office Action does not provide a unique numerical identifier for Park in the statement of rejection, Applicant's remarks assume that Park refers to U.S. Patent No. 6,649,508 listed in the Notice of References cited. Applicant respectfully

traverses the rejection on the basis that Park does not disclose or suggest all of the recitations of Claim 1. In rejecting Claim 1, the Office Action states that Park discloses:

- a conductive contact (38) in a hole in an interlevel dielectric layer (26a),
  - a first spacer (24) having a first dielectric constant on a side wall of the conductive contact; and
    - a second spacer (34) having a second dielectric constant that is less than the first dielectric constant located between the first spacer and the side wall of the conductive contact.

(Office Action, page 6.) Applicant respectfully submits that the statement of rejection in the Office Action incorrectly construes Park. Park discusses an oxide spacer 34 and a capping insulation layer 24 in contrast with first and second spacers. Specifically, the capping insulation layer 24 is not described as and does not provide the functionality of a spacer. In contrast with a first spacer on a side wall of the conductive contact, the capping insulation layer 24 "is then conformally deposited on the lower interlayer insulating layer 8, the pad plugs 10a, 10b, 10d and the bit line patterns 22." Park, column 5, lines 20-23. Applicant respectfully submits that Park is not ambiguous as to which of the components described are spacers. For example, in addition to the oxide spacer 34, Park also discusses an etch stop spacer 36. Given that Park specifically identifies the spacers therein, the capping insulation layer 24 can not be properly construed as a spacer.

Thus, Park does not disclose or suggest "a first spacer having a first dielectric constant on a side wall of the conductive contact; and a second spacer having a second dielectric constant that is less than the first dielectric constant located between the first spacer and the side wall of the conductive contact," as recited in Claim 1. Accordingly, Claim 1 is patentable over Park for at least these reasons.

### **Claim 1 is patentable over Gris**

The Office Action states that Claim 1 is rejected under 35 U.S.C. §102 as being anticipated by U.S. Patent No. 6,703,715 to Gris et al. ("Gris"). Office Action, page 5. Applicant respectfully traverses the rejection on the basis that Gris does not disclose or suggest all of the recitations of Claim 1. In rejecting Claim 1, the Office Action states that Gris discloses:

a conductive contact (20) in a hole in an interlevel dielectric layer, a first spacer (18) having a first dielectric constant on a side wall of the conductive contact; and

a second spacer (16) having a second dielectric constant that is less than the first dielectric constant located between the first spacer and the side wall of the conductive contact (column 7, lines 6-9).

(Office Action, page 5.) Applicant respectfully submits that the statement of rejection in the Office Action incorrectly construes Gris. As an initial matter, Applicant respectfully notes that the statement of rejection includes a citation directed to column 7 of Gris, which only includes six columns. This error notwithstanding, the components discussed in Gris, as cited in the Office Action, do not disclose or suggest the recitations of Claim 1. Gris discusses a polysilicon layer 20, a silicon nitride layer 18, and a very thin thermal oxide layer 16. Gris, column 4, lines 20-34 and column 5, lines 5-6. In contrast with the recitations of Claim 1, the thermal oxide layer 16, cited in the Office Action as a second spacer, is not between the polysilicon layer 20, cited in the Office Action as a conductive contact, and the silicon nitride layer 18, cited in the Office Action as a first spacer. *See e.g.*, Fig. 2F. Specifically, the arrangement of the layers described in Gris appears to be the opposite of the order as construed in the Office Action. Thus, Gris does not disclose or suggest the recitations of Claim 1, as presented in the Office Action.

Moreover, Gris explicitly describes an oxide spacer 19 but does not use the term "spacer" to identify any of the components recited in the Office Action. Thus, it is an improper construction to construe a silicon nitride layer 18 and a very thin thermal oxide layer 16 as spacers, absent a specific teaching or suggestion in the reference. Further, in addition to not being identified as spacers, the silicon nitride layer 18 and the very thin thermal oxide layer 16 are not present in Gris to satisfy a "spacer" function. Applicant respectfully submits that it is improper to construe a reference in a manner that is contrary to the teachings of the reference.

Thus, Gris does not disclose or suggest "a first spacer having a first dielectric constant on a side wall of the conductive contact; and a second spacer having a second dielectric constant that is less than the first dielectric constant located between the first spacer and the side wall of the conductive contact," as recited in Claim 1. Accordingly, Claim 1 is patentable over Gris for at least these reasons.

**Claim 10 is patentable over Park**

The Office Action states that Claim 10 is rejected under 35 U.S.C. §102 as being anticipated by Park. Office Action, page 6. Applicant respectfully traverses the rejection on the basis that Park does not disclose or suggest all of the recitations of Claim 10. In rejecting Claim 10, the Office Action states that Park discloses:

an integrated substrate (1) in which source/drain regions (6s') are formed;

a first interlevel dielectric layer (12a) which is formed on the integrated circuit substrate;

gate line patterns (22) which are formed in the first interlevel dielectric layer;

*contact pads (10a) which are present between adjacent gate line patterns in the first interlevel dielectric layer and electrically connected to the source/drain regions;*

*a second interlevel dielectric layer (26a) which is formed on the first interlevel dielectric layer, wherein contact holes, through which the contact pads are exposed, are formed in the second interlevel dielectric layer;*

first contact spacers (34) which are formed along the side walls of the second interlevel dielectric layer which is exposed via the contact holes, the first contact spacers being formed of silicon oxide;

second contact spacers (36) which are formed of silicon nitride and formed on the first contact spacers; and

contact plugs (38) which are present in the contact holes between the second contact spacers.

(Office Action, pages 7-8.) (*Emphasis added.*) Applicant disagrees. As a general matter, the devices that Park discusses, such as in Figure 7, are so distinctive from devices as recited in Claim 10, that no valid construction of Park can disclose or suggest the recitations of Claim 10. For example, if, as the Office Action states, the insulating layer 12a reads on the first interlevel dielectric layer, then the contact pads 10a in Park are not *in the first interlevel dielectric layer*, as recited in Claim 10. *See, e.g.,* Figure 7. Moreover, the contact pads 10a discussed in Park are in a layer below the bit line patterns 22 and thus are not *between adjacent gate line patterns*, as recited in Claim 10. *See, e.g.,* Figure 7.

Further, Park discusses that the upper interlayer insulating layer 26 is formed on the capping insulating layer 24 and not the first interlevel dielectric layer, as recited in

Claim 10. Column 5, lines 29-31. The additional structural distinctions between the devices discussed in Park and those of the recitations of Claim 10 are numerous and, for the sake of brevity, the discussion of which is reserved for future communications, if necessary. Applicant respectfully submits that for at least these reasons, Park does not disclose or suggest the recitations of Claim 10. Accordingly, Claim 10 is patentable over Park for at least these reasons.

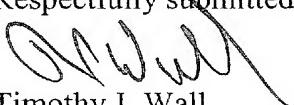
**Dependent claims are patentable**

Applicant respectfully submits that dependent Claims 2-7 and 11 are patentable at least per the patentability of the independent claims from which they depend. For example, regarding Claim 2, the Office Action states that Yokoyama discloses "wherein the first spacer comprises silicon nitride and the second spacer comprises silicon oxide." Office Action, page 3. The Office Action further includes a footnote that "[i]nterpreting the claim broadly, silicon oxynitride (SiON) is comprised of silicon oxide. Office Action, page 3. Applicant respectfully disagrees. One of ordinary skill in the art will appreciate that silicon oxynitride is not a "silicon oxide." Specifically, SiON is a specific compound having specific properties based on the composition that includes nitrogen. One of ordinary skill in the art would not consider that SiON is merely a silicon oxide to which a nitrogen is added. Thus, silicon oxide is distinctive from and not a component of SiON, as the Office Action alleges. For at least these reasons, Yokoyama does not disclose or suggest the recitations of dependent Claim 2.

Additionally, Applicant submits that various other ones of the dependent claims are separately patentable and, for the sake of brevity in this communication, will reserve the right to present such arguments in future communications if necessary.

## CONCLUSION

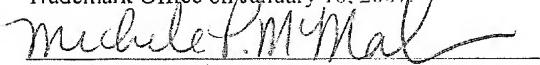
As all of the claims are now in condition for allowance, Applicants respectfully request allowance of the claims and passing of the application to issue in due course. Applicants urge the Examiner to contact Applicants' undersigned representative at (919) 854-1400 to resolve any remaining formal issues.

Respectfully submitted,  
  
Timothy J. Wall  
Registration No. 50,743

**USPTO Customer No. 20792**  
Myers Bigel Sibley & Sajovec  
Post Office Box 37428  
Raleigh, North Carolina 27627  
Telephone: 919/854-1400  
Facsimile: 919/854-1401

## CERTIFICATION OF ELECTRONIC TRANSMISSION UNDER 37 CFR § 1.8

I hereby certify that this correspondence is being transmitted electronically via EFS to the U.S. Patent and Trademark Office on January 16, 2007.

  
Michele P. McMahan  
Date of Signature: January 16, 2007